

AMENDMENTS TO THE CLAIMS

Please replace all previous versions and listings of claims in this application with the following listing of claims:

Claim Listing:

1. (Previously presented) An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering the audio signal so as to output an analog audio signal, the apparatus comprising:

a first control loop for feeding back a source voltage supplied to amplification means for amplifying the audio signal to a supply control portion of a power source for amplification and compensating a pulse width of a control signal for controlling supply of the power source for amplification; and

a second control loop for feeding forward the pulse width modulation signal to the supply control portion of the power source for amplification to compensate the pulse width of the control signal.

2. (Previously presented) An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering the audio signal so as to output an analog audio signal, the apparatus comprising:

a first control loop for feeding back a source voltage supplied to amplification means for amplifying the audio signal to a supply control portion of a power source for amplification; and

a second control loop for generating a signal of approximately the same amplitude as the variation of the source voltage supplied to the amplification means and of an opposite phase based on the pulse width modulation signal and feeding the signal forward to the supply control portion of the power source for amplification,

wherein the first and second control loops are used to control the supply of the power source for amplification.

3. (Currently amended) An audio reproducing apparatus, comprising:

modulation means for performing a conversion process based on modulation of an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying an audio signal based on the pulse width modulation signal generated by the modulation means;

filter means for filtering a signal outputted from the amplification means and generating an analog audio signal;

power source supply control means for controlling ~~supply of a power source for amplification~~ provided to the amplification means according to a predetermined control signal; and

compensation means for ~~feedback-inputting the signal of the amplitude according to~~ feeding back a source voltage supplied to the amplification means and for generating and feedforward-inputting ~~the a~~ signal of approximately ~~the a~~ same amplitude as ~~the a~~ variation of the source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal generated by the modulation means so as to compensate the predetermined control signal.

4. (Previously presented) The audio reproducing apparatus according to claim 3, wherein the power source supply control means is a switching regulator for exerting control to intermittently supply power from the power source for amplification to the amplification means according to the predetermined control signal; and

wherein the compensation means compensates the pulse width of the predetermined control signal based on the feedback-inputted and feedforward-inputted signals.

5. (Previously presented) An audio reproducing apparatus, comprising:

$\Delta\Sigma$ modulation means for performing a conversion process based on $\Delta\Sigma$ modulation to an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying the audio signal based on the pulse width modulation signal generated by the $\Delta\Sigma$ modulation means;

filter means for filtering a signal outputted from the amplification means and generating an analog audio signal;

power source supply control means for controlling supply of a power source for amplification to the amplification means according to a predetermined control signal;

triangular wave generation means for generating a triangular wave signal based on a predetermined clock signal;

signal generation means for generating a signal of approximately the same amplitude as the variation of a source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal generated by the $\Delta\Sigma$ modulation means;

first comparison means for inputting to one input terminal the signal of the amplitude according to the source voltage supplied to the amplification means and inputting to the other input terminal the signal from the power source for amplification and the signal generated by the signal generation means so as to compare the two input signals and generate a difference signal; and

second comparison means for inputting to one input terminal the triangular wave signal generated by the triangular wave generation means and inputting, to the other input terminal, the difference signal outputted from the first comparison means so as to compare the two input signals, generate the predetermined control signal, and supply the predetermined control signal to the power source supply control means.

6. (Previously presented) An audio reproducing apparatus, comprising:

$\Delta\Sigma$ modulation means for performing a conversion process based on $\Delta\Sigma$ modulation to an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying the audio signal based on the pulse width modulation signal generated by the $\Delta\Sigma$ modulation means;

filter means for filtering a signal outputted from the amplification means and generating an analog audio signal;

power source supply control means for controlling supply of a power source for amplification to the amplification means according to a predetermined control signal;

triangular wave generation means for generating a triangular wave signal based on a predetermined clock signal;

signal generation means for generating the signal of approximately the same amplitude as the variation of a source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal generated by the $\Delta\Sigma$ modulation means;

first comparison means for inputting to one input terminal the signal of the amplitude according to the source voltage supplied to the amplification means and the signal generated by the signal generation means and inputting to the other input terminal the signal from the power source for amplification so as to compare the two input signals and generate a difference signal; and

second comparison means for inputting to one input terminal the triangular wave signal generated by the triangular wave generation means and inputting to the other input terminal the difference signal outputted from the first comparison means so as to compare the two input signals and generate the predetermined control signal and supply the predetermined control signal to the power source supply control means.

7. (Currently amended) An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus comprising:

means for detecting a source voltage supplied to amplification means for amplifying the digital audio signal; and

feedback means for feeding the source voltage back to a supply control portion of a power source for amplification so as to compensate a pulse width of a control signal for controlling supply of the power source for amplification based on the source voltage fed back.

8. (Currently amended) An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus comprising:

generating means for generating a signal of approximately a same amplitude as a variation of a source voltage supplied to amplification means and of an opposite phase based on the pulse width modulation signal; and

~~feedback~~ feedforward means for feeding the signal forward to a supply control portion of the power source for amplification so as to compensate a pulse width of a control signal for controlling supply of the power source for amplification based on the signal fed forward.

9. (Previously presented) An audio reproducing method for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering the digital audio signal so as to output an analog audio signal, the method comprising:

feeding back a signal of an amplitude according to a source voltage supplied to amplification means;

amplifying the audio signal to a supply control portion of a power source for amplification;

generating a signal of approximately a same amplitude as a variation of the source voltage supplied to the amplification means and of an opposite phase based on the pulse width modulation signal;

feeding the generated signal forward to the supply control portion of the power source for amplification; and

compensating a pulse width of a predetermined control signal used for controlling supply of the power source for amplification to the amplification means.

10. (New) A digital power amplifier, comprising:

a DAC which outputs a PWM signal responsive to a 1-bit $\Delta\Sigma$ -modulated input signal;

a driver circuit which provides at least one drive control signal responsive to the PWM signal;

an amplifier circuit responsive to the PWM signal, the amplifier circuit being operatively controlled by the at least one drive control signal; and

a compensation circuit, comprising:

a difference amplifier;

a feedback control loop which provides an amplifier supply voltage from the amplifier circuit to the difference amplifier;

a feed-forward control loop which couples the PWM signal to the difference amplifier;

a voltage supply coupled to the difference amplifier; and

a comparator which compares an output of the difference amplifier and a reference signal and outputs a control signal in response thereto,

wherein the control signal controls a fluctuation of the amplifier supply voltage.

11. (New) The digital power amplifier of claim 10, wherein the reference signal is a triangular wave.

12. (New) The digital power amplifier of claim 10, wherein the feed-forward control loop provides a signal having essentially an equal amplitude and an opposite phase with respect to the amplifier supply voltage.

13. (New) The digital power amplifier of claim 10, wherein the output of the comparator compensates a pulse width of the PWM signal.

14. (New) The digital power amplifier of claim 13, wherein the fluctuation of the amplifier supply voltage is controlled by the compensated pulse width of the PWM signal.

15. (New) The digital power amplifier of claim 13, wherein the pulse width of the PWM signal is compensated without any feedback to the DAC.